Quality Basic Education Development in Nigeria: Imperative for Use of ICT

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Abstract

Information and Communication Technology (ICT) in education has been continuously linked to higher efficiency, higher productivity, and higher educational outcomes, including quality of cognitive, creative and innovative thinking. In response to the global imperative of Education for All, and not willing to be left at lower side of 'digital divide' Nigeria launched Universal Basic Education in 1999 and developed an ICT policy in 2001. One of the objectives of the policy focused on integrating ICT into the mainstream of education and training, including basic education. This has been evolving through a number of private and donor-funded initiatives though there is the need to ensure effective and sustained use of ICT in mainstream formal education system. This study explores Nigeria's ICT in education policies, implementation efforts, and availability of ICT tools in schools; teachers' knowledge, experience and practices in use of ICT at the basic education level; using qualitative analysis of existing documents and descriptive research design. The survey instrument is a self-designed and validated 50-item questionnaire administered to sampled basic education teachers in Lagos state. Findings showed that Nigeria is yet to fully commit to ICT integration in education as two key ingredients are lacking- skilled teachers and ICT tools and other infrastructures. It was recommended that these issues must be addressed within a focused and implementation committed ICT in education policy.

Background: Why ICT in Education?

ICT is the emergence of tools of microelectronic and telecommunications that are used in the automatic acquisition, analysis, storage, retrieval, manipulation, management, control, movement, display, transmission, reception, and interchange of quantitative and qualitative data (Boritz, 2000; Cheta, 2003). Haddad (2002) divided ICT in education into three categories: instruments (TV, DVD, computer), instructional (video and multimedia modules) and dissemination (TV broadcast, CD or Web), but emphasized that the choice of technology and the way it is used is partially determined by what is expected in terms of education, learning and teaching objectives. According to him, 'to tech or not to tech'

education is not the question; the real question is how to harvest the power of ICTs to make education more relevant, responsible and effective for school setting and lifelong learning. To compete successfully in a competitive global economic environment, a highly skilled and educated workforce with aptitude and skills in the application of ICT is very essential. This makes knowledge and use of ICT central to education in the 21st century (Wolff and Mackinnon 2002). People need to be effective and efficient in the use of ICT for success in today's rapidly changing and highly competitive world which depends on such knowledge and skills; hence the concern for Africa to take the best advantage of the knowledge economy (Obanya 2004). Assie-Lumumba (2008) captured this succinctly:

> *Beyond the immediate educational goal is the question of how to provide the 'best education' to form the next generation of competent leaders from community to the national and global levels, economic planners, scientists, artists, humanists and more generally informed citizens, especially in this fast-paced, technology-prone and globalize world. (p.2)*

Nigeria, like many other countries around the world, has over the years sought to improve its education system by introducing reforms and making plans based on the education needs of the country, hence the development of Universal Basic Education (UBE). The broad aim is to give a solid foundation for life-long learning through the inculcation of appropriate learning-to-learn, self-awareness, citizenship and life skills (FGN 2003). With this focus, it can be concluded that beyond increasing access to education, ensuring quality is a key goal of basic education in Nigeria. This is in support of the Dakar Framework for Action (2000) in Education for all (EFA) that quality is at the heart of education- a fundamental determinant of enrolment, retention and achievement.

Quality improvement has two important dimensions: increase in the amount of subjects covered by existing curriculum, and through better pedagogy (changes in the learning process). The later includes developing new types of learning; ability to gather and manipulate information, problem solving, higher order thinking, critical and creative thinking and other necessary skills to interact in knowledge based economies. The need for the changes in the learning process paved way for ICT use in the teaching and learning processes where students are expected to play more active roles than before (Alabi 2004); especially if basic education should target the four pillars of learning- learning to learn, learning to be, learning live together, learning to be (Delors 1996).

Studies have further established the roles of ICT in achieving quality education at all levels of the school system. ICT is seen as key tools in acquiring, processing and disseminating knowledge (Adedoyin, Akinnuwesi & Adegoke 2008). It offers increasing possibilities for codification of knowledge about teaching activities through being able to deliver learning cognitive activities anywhere, anytime (Larsen & Vincent-Lancrin 2005). Yusuf (2005a) noted that ICT has impacted on the quality and quantity of

teaching, learning and research in traditional and distance education institutions through provision of dynamic, interactive and engaging content and providing real opportunities for individualized instruction. It has the potential to accelerate, enrich and deepen skills, motivate and engage students in learning; help to relate school experiences to work practices, contribute to radical changes in the schools and provide opportunities for connection between the school and the real world (Davis & Tearle 1999, Lemke & Coughlin 1998). Other researches have also argued that ICT have the potential to transform learning environments and improve the quality of learning (Siemens 2005), by making learning more situated (Bransford et al. 1999), providing access to richer environment (Caplan 2005), increasing opportunities for active learning, interconnectivity and feedback (Launllard 2002, Jonassen et al 2003), enhancing motivation to learn (Abrami 2001), offering varieties of new possibilities to learners (Breuleux et al. 2002) and having a positive effect on students' achievement in different subject areas (Chambers 2003). ICT can therefore make the school more efficient and productive thereby engendering a variety of tools to enhance and facilitate professional activities (Kirschner & Woperies 2003). Haddad & Jurich (2002) summed it up:

> *The traditional model of learning emphasizes mastery of facts and concepts. ICT diversifies the system of representation through the use of various stimuli (images, sounds and movement) and address the needs of diverse types of learning (visual, psychomotor, and affective). (p.33)*

Beyond the benefits, a practical application of ICT in the achievement of EFA goals and especially in the context of Nigeria's UBE is demonstrable in the following ways, among others (Pelgrum, 1996; Bottino, 2001; Haddad, 2002)

- Provide access to education beyond the formal schooling environment, as being used in some radio, television and web programs to reach children and adults who are not easily accessible. A case in study is the nomads in Nigeria.
- Within the classroom, ICT tools can be used for creative, communicative, collaborative and task-based activities during instruction in various school subjects especially mathematics, languages and sciences; as well as encourage self discovery by learners.
- ICT tools have been proven to be of significant input in teacher professional development as quality in education is also dependent on teacher competencies. This is achieved through access to online journals, joining discussion forums, downloading lesson ideas and plans, exploiting teaching resources, and record keeping.

However, and despite all justification for the need for and use of ICT in the teaching and learning processes to achieve the goals of basic education, the vision of easy access to all is justifiable but had to achieve (Haddad 2002). This is especially the case in Nigeria.

Statement of Problem

With a population over 148million, an active member of E9 and among the next 'eleven' group of potentially endowed nations (Goldman Sachs 2007)), Nigeria has set for herself a wide array of ambitious goals of several global and national frameworks that seek to promote the fundamental right of her citizens to quality education. Despite this, at the E9 meeting held in Indonesia in April 2008, it was revealed that Nigeria is one of the only two countries that were at the risk of not meeting the targets of EFA, because the quality of teaching and learning in our schools remain a significant challenge. The Millennium Development Goals Report (UN 2005) acknowledges that quality assurance in education is yet to be adequately addressed in terms of teachers, curricula, teachers' support and teaching learning materials. Igbuzor (2006) noted that the process of learning and teaching does not lead to production of analytical, critical and engaging products; the teachers do not have the competence and skills to use active pedagogies, and that the content of education in Nigeria is irrelevant to the needs of prospective job seekers. Various studies conducted in Nigeria have also shown clearly that there are low academic achievements among pupils in such basic skills as literacy, numeracy and life skills (Lawal, 1995; Aderinoye 2002, Afe, 2006). There are also proposals on how ICT be deployed for effective acquisition of these skills (Haddad, 2002; Salawu, 2008). In ensuring effective use of ICT in educational systems, UNESCO (2004) identified a number of frameworks for setting ICT for education programmes. These include: policy and vision of ICT use in schools, technology and infrastructure, curriculum, pedagogy and content development, professional development, monitoring and supervision. Using these criteria, has Nigeria been able to recognize ICT roles in her educational policies and therefore committed to its practice and implementation, especially in the context of achieving quality education, lifelong learning, teacher training and the development of skills of literacy, numeracy and life skills? This study hopes to provide insights to these concerns. The study therefore determines Nigeria's visions for ICT in basic education and examines its implementation in terms of the availability of ICT tools in schools and their application in improving teaching and learning in basic school subjects.

Scope of the Study

For Nigeria, basic education comprises both the range of formal schooling (private and public) as well as a wide variety of non-formal education activities offered to meet the learning needs of groups of people of all ages. However, for this study, the focus is on ICT use in teaching and learning activities within the formal system of basic education, i.e. schools, comprising the nine years of basic education which, according to the UBE Act, is free, compulsory and functional. Basic education schools, i.e. primary and junior secondary schools in Lagos state of Nigeria are used as subjects.

Research Questions

1. What is Nigeria's vision for integrating ICT in basic education, especially in teaching and learning processes? Is this vision articulated in any policy?
2. What initiatives have the government proposed and implemented to integrate ICT in basic education in terms of access and infrastructure and human resource development?
3. What are the available ICT tools in teaching and learning in basic schools in Nigeria?
4. What is the teachers' background in the use of ICT as well as the teachers' ICT behavior?
5. What are the barriers to ICT integration in teaching-learning process?

Methodology

Qualitative reviews through the analysis of policy documents in education, namely; National Policy on Education (FGN 2004), National Policy on Computer Education (FME 1988), National Policy for Information Technology (Federal Ministry of Science & Technology 2001) and National Policy on Teacher Education (FME 2007) were done to answer the first two research questions .In addition, the study used descriptive survey design employing random sampling procedures to select subjects and utilizing quantitative data from in-service teachers of basic schools. The data, which were collected between July and August 2009, were employed in answering research questions three and four. The sample consisted of 351 basic education teachers from private and public schools in Lagos state, Nigeria. Lagos state was purposively sampled for a number of reasons: though one of the 36 states in Nigeria, its population (20 million) constitutes about 13.5% of Nigeria's total population. As a former capital of Nigeria, it is often referred to as the commercial nerve centre of the country which placed it in greater demand for ICT use in schools and work environments. In addition, it was the earliest state to have come in contact with western education, and subsequently globalization (of which ICT is core). With these attributes, it is believed that the study findings from Lagos State will set the tone for ICT deployment in other parts of Nigeria. The teachers sampled included 220 public and 131 private school teachers, all randomly selected from different schools in Lagos State. Their basic statistics include: 68.6% females and 31.3% males; 7.4% of them had Grade II teaching certificate, 36.7% had Nigerian Certificate in Education (NCE), 37% had a first degree while 18.8% had National Diploma (ND), signifying that a total of 92 (26.2%) of the sample are not qualified teachers. Their teaching experiences also range from 0-5 years (50.4%), 6-10 years (25.2%), 11-14 years (12.6%) and 15 years above (11.8%). This signified that majority of those sampled are newly qualified teachers who are expected to be in tune with the use of ICTs in schools by virtue of their recent training. The instrument used is a comprehensive self-designed 50-item questionnaire exploring

information from the teachers about ICT infrastructures available in their schools, the teachers' background and experience in the use of ICT, how they use ICT in instructional processes, their attitude and behavior in the use of ICT as well as students' reception and competence in learning with ICT. Based on these divisions, the questionnaire had 6 sections, with each section dedicated to each theme. To ascertain its validity, the questionnaire was subjected to opinions of experienced lecturers of education, especially experts in educational technology, whose suggestions were used to modify the instrument before it was trial tested on thirty basic education teachers from different schools from the main sample in Lagos state. The questionnaire was validated using Cronbach Coefficient. The final internal consistency (reliability) of instrument was found to be 0.79. 400 questionnaires were administered through face-to-face technique within four weeks, while 351 were returned, signifying a return rate of 87.7%.

Findings

The findings of the study are presented thus, based on the research questions.

1. Nigeria's Vision for Integrating ICT in Schools

As a signatory to a number of pacts and treaties to the World declarations on education (Education for All and the Millennium Development Goals), which also spurred her to develop a number of policies in this regard, Nigeria also committed herself to the promotion of quality education through ICT. These policies have made it imperative for Nigeria not be left at the lower realm of the 'digital divide'. The Nigerian National Policy on Education (2004) recognized education as instrument *per excellence* for effecting national development, through "the acquisition of appropriate skills, abilities and competencies, mental and physical, as necessary for the individual to live in and contribute to the development of his society" (p.7). It stipulates that education has to be tailored towards self-realization, right human relations, individual and national efficiency, effective citizenship, national consciousness, national unity as well as social, cultural, economic, political, scientific and technological progress (NPE 2004, p.7). In order to realize these objectives, ICT is emphasized at all levels of Nigerian education:

- All states, teachers' resource centers, university institutes of education, and other professional bodies in education shall belong to the network of ICT (section II, sub-section 102(a) p.53).
- Government shall provide facilities and necessary infrastructure for the promotion of ICT and its use as learning tools at all levels of education (section II, sub-section 102(d) p.53).
- Virtual library project, aimed at the rejuvenation of the Nigerian schools through provision of easy access to current books, journals and other information sources using digital technology was also included.

The same is also emphasized in the Universal Basic Education (UBE) policy that:

UBE is also an opportunity for Nigeria to confront head-on the challenges

of and to take full advantage of the possibilities offered by new information and communication technologies for improving the quality education. The information age is also the age of knowledge. No school system can afford to stay outside the knowledge age while serving world that is now run by knowledge. The way out of the dilemma is the integration of computer appreciation, computer literacy, and computer applications into UBE (FGN, 2003; Article 28, p.8).

In addition and in preparation for the integration of ICT in schools, Nigeria developed the National Policy on Computer Education in 1988 with the objective to encourage teachers to develop a sense of rapport with computer and appreciate its potentials for solving teaching and learning challenges, and to entrench computer culture that permeates all activities in institutions of learning (Abimbade et al. 2003). The modalities for achieving the objectives include training teachers and associated personnel, hardware facilities, curriculum development, software developments and evaluation, maintenance of hardware and peripherals (Jegede & Owolabi 2005). Government implemented the initiative through federal government colleges and unity schools. It later permeated other state-owned and private schools. However, the policy, with its lofty goals did not take off beyond the distribution and installation of computers in some schools (Aduwa-Ogiegbam & Iyamu 2005).

The National Policy for Information Technology was formulated in 2001 with a vision 'to make Nigeria IT capable country in Africa and a key player in the information, using IT as the engine for sustainable development, and global competitiveness (Federal Ministry of Science & Technology, 2001). The mission statement recognized the need to use IT for education (p.iii). In addition, the general objectives (3 out of 31) focused on integrating ICT into the mainstream education and training, with a strategy to "restructure educational systems at all levels to respond effectively to the challenges and imagined impact of the information. Yusuf (2005a) noted that although the mission, general objectives and strategies recognized the importance of ICT in education, the document has no sectoral application to education and issues relating to education are subsumed under human resources development. To this end, the National Information Technology Development Agency (NITDA) was established, which serves as the clearing house for IT projects in the public sector, including education. It developed some standards for computer uses in schools, including students- computer ratio, stipulating that;
- Early Child Care Development Education (ECCDE)- 50pupils to one functional computer
- Primary- 50pupils to one functional computer
- Post primary- 40 students to one functional computer
- Tertiary- 25 students to one functional computer

In implementing the ratio, schools are required to establish computer laboratories

and classrooms equipped with interactive white boards and other teacher-aided learning tools.

In terms of ICT and teacher development, the National Policy on Teacher Education (FME, 2007) developed a vision "to produce quality, highly skilled, knowledgeable and creative teachers based on explicit performance standards through pre-service and in-service programs to raise a generation of students who can compete globally' (p.6). The goal is to 'ensure teachers are trained and recruited to teach world-class standards and continue to develop their competence over their entire career' (p.6). ICT was identified as one of the conditions for the achievement of the goal, as 'the training of teachers on strategies of collaboration, reflection on enforcement of ICT practices and action research' (p.5).

Having demonstrated a strong commitment to the promotion of ICT in her educational and economic goals, it should be noted that Nigeria has no particularly articulated policy for ICT in education. However, the examined policies demonstrated that government stands committed to developing a comprehensive ICT tools integration in education within a national IT policy, basic education reforms and poverty reduction strategy. Beyond this, it has been posited that the formulation of an information technology (IT) policy constituted only about 20% of the IT solution for the country, but the remaining 80% lies with implementation (Isoun 2001).

2. ICT-in-Education Implementation Initiatives

Owhotu (2006) noted within her sub-region, Nigeria has been in the lead in the integration of ICT tools with a number of initiatives; through collaborations with the government, by development partners, NGOs (international and local) and private corporations. Some are briefly discussed.

- **SchoolNet Nigeria**: Launched in September 2001 and funded by Education Trust Fund, SchoolNet is engaged in the effective and sustainable deployment and use of Information and Communication Technologies (ICTs) to enhance teaching and learning in the primary and secondary education sector. It embodies a partnership between public and private sector interests and is affiliated to SchoolNet Africa. The core activities are in implementation, support and co-ordination of ICT national and state level development projects in education through technology support, training and development of relevant content.
- **Education Trust Fund (ETF)**: Education Tax is a 2% of companies' profit tax which is distributed by the Education Trust Fund for education purposes. Besides working with SchoolNet Nigeria, ETF also works on the Education Resource Center project which aims to create science labs, ICT laboratories, libraries and multi-purpose halls in schools and institutions of higher learning. ETF also provides funding to universities and other institutions to improve education levels and standards.

- **Computers-in-Schools project**: This was kick-started in 2002. The major objective is to develop computer and technological literacy through the introduction of computers in secondary schools similar to what has been done in many other countries including Turkey and Morocco.

- **One-laptop- per-child (OLPC)**: September 2006 witnessed the launch of the one-laptop- per-child (OLPC) initiative in collaboration with the Nigeria government which has resulted in the provision of 100-dollar laptop for the e-secondary school project in Nigeria. Nigerian software developers are concentrating on integrating local curriculum content into the project, covering every subject in the school system from JSS 1-JSS 3 and then SSS 1-SSS 3. With OLPC however, there is still the need to give schools a satellite dish, power generator and a modem to ensure electricity and connectivity.

- **Interactive Radio Program**: Access to radio and television as information and communication tools is very pervasive in Nigeria with the penetration of radio reaching about 90 per cent. Through the National Commission for Nomadic Education, IRI was launched in 1992 to provide open and distance education to pastoral nomads. Using Federal Radio Corporation of Nigeria (FRCN), Kaduna, and particular hours of the day is dedicated to air participatory instructions on basic functional literacy and numeracy, health and environmental education, introduction of modern techniques in animal husbandry and processing of dairy products and civil responsibilities. The radio program is participatory, making it widely accepted and appreciated by the nomads as they listen to this program and respond using a feedback mechanism that has been set up to monitor the programmer's efficacy. It contains weekly news items, views, interviews, discussions, music, drama, jingles, etc. There are also school based IRI programs to improve quality of teaching and learning where performance is low and teachers are poorly trained. One notable example is IRI adoption by USAID's Community Participation for Action in the Social Sector's (COMPASS) program to improve literacy and numeracy skills of pupils in Lagos, Nasarawa and Kano states.

- **The NEPAD e-Schools Initiative** is being led by the e-Africa Commission. Its stated objective is "ensuring that young Africans participate actively in the global information society and knowledge economy", with focus on ICT skills and knowledge to primary and secondary school students through series of trainings to teachers and school administrators, in collaboration with Intel, Microsoft, HP and other IT companies. In Nigeria, NEPAD initiative is chaired by NITDA and is currently working out strategies of connecting some schools to the internet. Other initiatives include: the National Infrastructure framework for Open and Distance Learning, Virtual Library project, Microsoft IT academies, etc. ICT efforts in Nigeria are majorly driven by private initiatives. While these are welcomed developments in integrating ICT into education, there is the need to sustain the integration through conscious, planned, and deliberate utilization of ICT in instructional processes in schools, as effective use of e-learning requires the presence of extensive and sustained support (Knowles 2004).

These initiatives are often piloted, short term, donor-funded projects which give

no room for continuity and sustainability. They often show pockets of efforts with no coordination, resulting in poor distribution of resources, duplication of efforts and lack of meaningful results. Though there are often data supplied to support the impact of these programs, the percentage of beneficiaries is small compared to the number of school age children that require such opportunities. In addition, there is no mechanism put in place for measuring the subsequent performance and learning achievements of recipients of these projects. Their impact is therefore minimal, if any.

3. ICT Tools Available in Basic Education Schools

This section is addressed through data generated from the survey of teachers of basic school. As a basic requirement in steps towards ICT focus on computers, the study tried to find out the availability of computers in schools as well as its use. While 66.7% of the teachers sampled claimed they have computers in schools, only 9.3% of these (22 teachers) actually have computers in their classrooms, and just 29.8% (70 teachers) use it at all in delivering instructions. This figure is disappointingly low when viewed in terms of the intentions and plans discussed in the policies on ICT integration is schools. The availability of other ICT tools is lower than computers, and where they are present, the numbers are very insignificant. Teachers could not state the functions of some (CD ROM, CD Writers, Scanner and LCD Monitor); maybe because they are used chiefly for administrative purposes, while radio, television and video player from the description of usage are used at lower primary schools. Of course, they all have GSM phones, but these are teachers' personal possessions and not used in schools. Teaching and learning with ICT only involves exposing students to computer instruction in some cases, while there is no focus on this in most of the schools. From the data collected, basic education students do not have adequate exposure to computer; talk less of other ICT tools. Only 29.8% of teachers observed that they teach computer skills in their schools while 64.7% have no idea if their students are computer literate. Of those who admitted to teaching computer skills, 30.4% noted that their students do appreciate and are excited about these lessons. The numbers of computers in each of the schools also vary as between 2-6 students share a computer in those schools where computers are available.

4. Teachers' background in, understanding and perception of ICT

Of the teachers sampled, only 33.7% claimed to have personal computer, while 27.5% admitted to being introduced to some ICT during their training as teachers. Also, 35.3% admitted to having an e-mail account and out of this, 50.6% claimed they check their mail just occasionally. Surprisingly, as much as 41.4% claimed they never visited the internet at all, while those who do, only 5.8% went there for the purpose of research, however, when asked to name sites they have visited, names such as yahoo.com, yahoo. co.uk, yahoo.ca, Gmail and Google came up, meaning they could not differentiate between internet hosts, search engines and web sites. It is noted that teachers are not well equipped to teach using ICT. Because of the nature of exposure to ICT, most teachers operate

even below the emerging level. This is in agreement with the Adeosun & Maduekwe (2008) that Nigerian teachers possess lower level skills in use of ICT. This includes very basic knowledge of computer (low ability to use a computer operating system including basic hardware and the little understanding of basic terminology and concepts). Majority of subjects acquired internet/computer skills rather informally, i.e. through self efforts by computer training courses which are either self paid, or crash programs often organized by NGOs, corporations and development partners, and sometimes, reliance on friends/relatives. The findings supported Yusuf's study (2005b), where he found that most teachers in Nigeria do not have the needed experience and competence in the use of computers either for educational or professional purposes, neither do they have the needed competence in basic computer operations, skills and knowledge in the use of common computer software. He further observed that the existing curriculum designed for the training of pre-service teachers in Nigeria does not include the practical usage of ICT materials such as computers and their software, slides, overhead projectors etc. Even when it is included, it is only based on theoretical paradigms. Student teachers hardly come in contact with ICT instructional materials, including those who are running programs in educational technology. This explains teachers' indifference to ICT shown in *table 1*(over 50% of teachers chose not applicable for each perception construct). This could be attributed to a number of factors, mostly the lack of training in the use of ICT, as well as the nature of training of some teachers had. In a study of primary school teachers use of ICT, Okafor & Edet (2008) revealed that than 99% of sampled were yearning for in-service training that would enhance their teaching competences and the achievement of the objectives of ICT use in the curriculum.

Table 1. Teachers' Perception of ICT

Constructs	Agree (1%)	Disagree (1%)	Not applicable(%)
I am active in the use of ICT in the classroom	21.7	13.6	56.3
I make allowance for ICT use	15.5	17.8	57.9
I consider ICT useful for learning	9.1	26.2	58.9
Students can use computers at home if they so wish	14.2	25.6	55.0
ICT is not relevant to teaching	9.1	27.8	57.6
I use ICT only for personal purposes	26.6	9.1	58.9
I use ICT for professional purposes	21.7	12.0	59.9
I do not feel threatened with the use of ICT	10.7	24.3	57.6
I feel inadequate in using ICT	20.4	17.8	57.0
I seek out ideas about ICT always	20.4	13.9	57.0
I always try out some learning activities with ICT	26.5	10.4	56.3
I use ICT based on the recommendation of another teacher	10.7	21.0	60.8
I depend on other teachers to use ICT	12.3	20.1	60.2
I encourage my pupils to use ICT	24.3	7.8	61.2
ICT is an enhancement to my classroom	23.9	8.1	60.2
ICT is critical to learning achievement	24.3	8.7	60.5
I make efforts to upgrade my computer skills	24.9	10.4	59.2
I am a major contributor to ICT development in my school	16.2	13.9	60.2
I am incapable of operating ICT tools independently	18.1	17.5	58.9

5. Barriers to ICT Integration in schools

The study has been able to establish that a chief barrier to ICT integration in schools is the lack of skilled teachers. However, the teachers' identified barriers are shown in *figure 1*. While all barriers identified are significant, according to the teachers, lack of time is a chief impediment to ICT integration. This can be perceived in two ways: (1) lack of time on the part of the teachers to engage in training in the use of ICT as a form of professional development, or the lack of instructional time to effectively use ICT within a forty-minute lesson usually allocated for basic school subjects in Nigeria. However, the teachers' identified barriers have been supported by a number of studies (Aduwa-Ogiegba & Iyamu 2005, Okafor & Edet 2008, and Salawu 2008). These include limited ICT infrastructures, poor internet connectivity, inadequate learning resources (educational tools, course curriculum, etc.) attitudes of teacher-trainees and teacher trainers which indicate a gross lacking in independent learning skills and reluctance to take responsibility for their own learning, software license and highly prohibitive costs associated with, lack of maintenance and technical support, and most importantly poor power supply, a problem that is peculiar to Nigeria (Olakulehin, 2007). Ololube (2006) also attributed these barriers to economic disadvantages and government policies. Also, basic infrastructures in schools- buildings, furniture, books, libraries, laboratories and adequate classrooms- are

still are big challenges which may make blending education and technology especially at lower levels a farce.
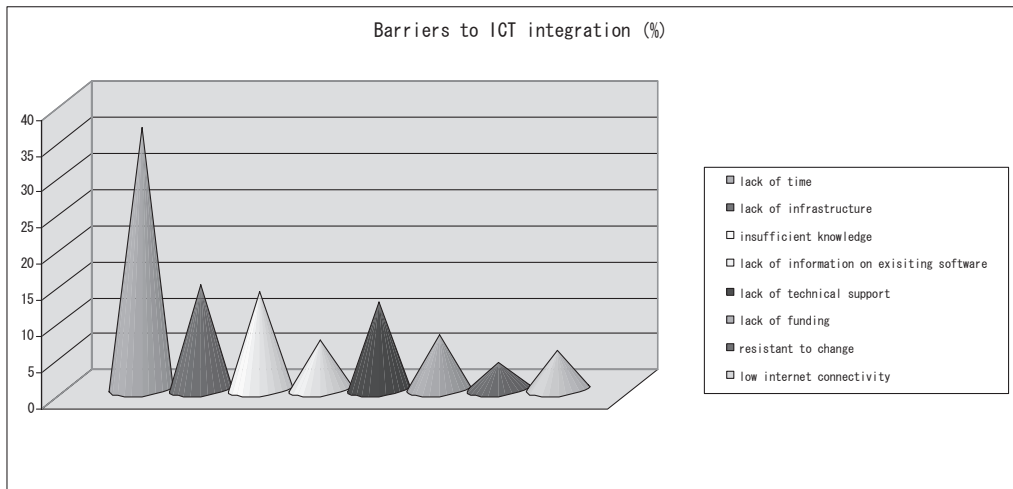
Figure 1. Barriers to ICT integration

Discussion and Implication

The results from the data presented showed that in spite of the government visions and polices for the use and integration of ICT in schools, two very important features of integration are lacking- human resource development in terms of skilled teachers to use ICT in teaching and learning processes, as well as ICT infrastructures. Very few of the sampled schools can actually boast of even minimal provision of ICT tools. Also, the exclusive focus on computers by the respondents also showed that to most Nigerians, including teachers, ICT integration stopped at the use of computers, and that to be ICT aware is to be computer literate. Computer literacy is essential for ICT use especially in education as Cajkler (1993) and Higham & Macaro (1993) noted that all teachers and trainees should have opportunity to experience ICT skills as a normal and inescapable part of their training. It is unfortunate that the teachers could not demonstrate evidence of effective acquisition and use of ICT even at the basic skill level, hence they cannot fully utilize technology in their classrooms, and the traditional 'chalk and talk' approach still dominates the school pedagogy. The sample teachers also show some ignorance of the trends in the 21st world as access and regular use of e-mail and other internet features is a powerful tool for teacher continuous professional development in terms of collaboration with other professional colleagues and access to updated researches. While some of the teachers made efforts to acquire computer skills, this is not helpful to their professional development as most do not have e-mail accounts and rarely visits the internet, while those who visit the internet could not demonstrate effective knowledge of ICT tools as well as search engines. It is also disheartening that none of the teachers sampled confessed

to being a beneficiary of the multiples of trainings often organized by governments, NGOs, development partners and corporate organizations. While the modality for selection for the trainings was not explored in this study, this observation lends credence to the notion of 'pockets of efforts' in ICT integration, marked by lack of coordination and therefore ineffectiveness.

Most importantly, ICT tools and equipments are grossly lacking in almost all the sampled schools. Even when they are available, they need to function with other infrastructure such as electricity under controlled and reliable conditions. For over three decades, Nigeria has been unable to provide minimum acceptable standards of electricity service to her citizens. Initiatives by NGOs and Corporations in donating hardware, software, internet access and trainings to some schools are often incomplete without provisions for generating sets to enable these projects function properly. In rural Nigeria most inhabitant do not have access to electricity, thereby denying rural schools opportunity to benefit from the use of electronic equipment such as radio, television, video recorders and computers. The few Internet access available in Nigeria is found in urban centers. According to Ndukwe (2007) all ICT equipment, infrastructure and terminals depend on electricity to energize, unless this vital source is always available and reliable, Nigerians will not be able to fully enjoy the benefits that the digital revolution offers and that overcoming the energy crises is a major pre-requisite for Nigeria to achieve its Vision 20-2020. These environmental realities make ICT integration and sustainability difficult.

Recommendations & Conclusion

It is no more disputable that ICT is important in the development of quality teaching and learning in educational systems around the world, as well as a means for fundamental transformation into the existing school principles and practices for the preparation of students in meeting the innovations in the global arena. Achievements in the ICT penetration and usage in Nigeria basic education programs is dependent on the recognition of this importance, beyond policies and disjointed efforts at ICT application to education. According to Yusuf (2005a), the world outside the school system has been able to achieve much in the area of ICT integration in their daily routine, while the schools are left behind. Since ICTs are seen as add-ons to the education system, there is little recognition that ICT can be used to supplement and complement the conventional education delivery system or processes, or that they can be used to improve the quality of teacher training programs. As a result, few teachers have been provided with training on how to integrate ICT into the teaching/learning process. Lack of teachers' skill in ICT use made changes noted in schools smaller than expected. It is therefore imperative for government to demonstrate more serious attitude to the use of ICT in schools. It should start with the provision of facilities, but more importantly, training of teachers. Olakulehin (2007) noted that it is important that teachers in the training institutions are imbued with the skills and

abilities of ICT literacy and sensibilities so that the knowledge and attitude acquired will cascade onto the learners that they come in contact with in the classrooms when they begin to practice. There is therefore need to consider how best to integrate specific ICT objectives and resources into the teacher education program. As the Internet becomes an importance part of education and as literacy is redefined by the new technology, it will be mandatory that teacher trainers integrate this new resource with daily instruction so that trainees can learn how to develop the new literacy this technology permits. In-service and pre-service teachers need training and empowerment on the use of technological skills. They are expected to apply their collaborative, communicative, acquisition and problem-solving skills in the use of the Internet in their curriculum. This situation emphasizes how important it is then for teacher preparation and staff development programs to acknowledge the convergence of the internet, instruction and to prepare teachers to integrate technology with curriculum.

Moreover, issues related to digital divide require comprehensive solutions that integrate people, processes and technology; hence government needs a strong political will to address key issues so that such efforts can be effectively complimented and productive. There is need to create an enabling environment for teacher education programs to strive toward producing highly qualified ICT literate teachers and teacher educators that would assist in making the integration and usage of ICT in schools a success. For sustainable integration of ICT in education, funding and other infrastructural issues should also be addressed. Nigeria also the need to develop a specific policy for ICT in education- a national policy for ICT in education will help to locate Nigeria in the emerging global knowledge based economy, coupled with strategic investment in education to enable greater productivity in the workforce and thus increased national competitiveness. In harmonizing the efforts in the education sector with the national effort, the Ministry of Education should have a standard policy for stakeholders to have inputs to the process of defining a common vision for the systematic integration of Information and Communications Technology in the education system.

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